REMARKS

35 USC 102

Claims 1, 2, 4, 10, 13, 15, and 16 are rejected under 35 USC 102(b) as being anticipated by Lee.

Claim 1 recites the step of combining information with a spread sequence to obtain a spread information signal. Subsequent to the combining step, a spectral representation of the spread information signal is generated. Thus, the result of the combining step is a "spread information signal" and the input into the generating step is the "spread information signal." As a result, Claim 1 recites that the generating step uses a signal having the spread sequence and the information bits.

In Lee, on the other hand, the spread sequence PN at line 412 is transformed into the subband domain by block 410 to create the equivalent of a "spectral representation of the spread sequence." After the operation performed by elements 430 to 436, however, Lee has a spectral spread information signal similar to SPD_0 to SPN_{N-1}.

Thus, because SPD_0 to SPD_{N-1} is equated with "the spectral spread information signal" of Claim 1, Lee does not have any counterpart for the establishing step and for the weighting step.

As the Examiner points out, Lee mentions a psychoacoustic model. However, as stated in column 7, lines 3 to 34 and 55 to 64, this psychoacoustic model is only used for bit allocation and quantization but is not used for hiding data. Thus, since the establishing step specifically refers to "the short-term spectrum of the audio signal," that is, the short-term spectrum of the audio signal that is obtained after the step of processing, Lee does not fulfill the working of the establishing step. Lee would show the feature if the output of block 404 was input into a psychoacoustic model. However, this is not disclosed in Lee. Applicants therefore respectfully submit that the Examiner incorrectly asserts that Lee discloses the step of establishing as defined in Claim 1.

Most importantly, the step of establishing recites that the psychoacoustic maskable noise energy is established as a function of frequency. Thus, for normal audio signals, the psychoacoustic maskable noise energy is different from frequency to frequency. As known in the art, the psychoacoustic maskable noise energy is higher when the signal power in a band is higher. However, when the signal power in a band is low, then the psychoacoustic maskable noise energy for this band is low as well. Therefore, the step of establishing results in a different psychoacoustic maskable noise energy for each band when the signal energy in each band is different than is normally the case for audio signals. Generally, audio signals have high signal energy in the lower bands and the signal energy decreases from lower bands to higher bands and is quite low in

higher bands and finally quite low psychoacoustic maskable noise energy in the highest band.

It appears that the Examiner is comparing the power control input, i.e., the block that is not shown in Figure 4 but that provides the power control signal on line 419 to the "establishing psychoacoustic maskable noise energy as function of frequency" step. However, this is incorrect. The power control parameter on line 419 is the same for all N bands.

The same value on line 422 is applied to each of the items 430, 432, 434, and 436. Therefore, Lee clearly does not disclose that the generation of the power control parameter on line 419 is a psychoacoustic maskable noise energy establishment as a function of frequency for the short-term spectrum of the audio signal. Instead, as outlined in column 11, lines 53 to 57, the noise quantization floor of all audio subband samples, i.e., all subband samples in all subbands 0 to N is determined and that subsequently one and the same parameter for all different N subbands is established and applied. This is not an establishment of psychoacoustic maskable noise energy as a function of frequency.

If the Examiner was correct, the value applied to the different items 430 to 436 would be different from subband to subband. In other words, there would have to be a subband-wise calculation of a power control signal. However, this is not disclosed in Lee.

The Examiner correctly points out in the last paragraph on page 15 through the first paragraph on page 16 that Lee would like to ensure that the carried auxiliary data is substantially inaudible. However, how this goal is achieved is different from Claim 1.

Lee states that a signle power control value per block, which is the same power control value for all subbands, has to be calculated so that the auxiliary data signal is below the noise quantization floor of the audio subband samples of all subbands.

In contrast thereto, Claim 1 determines a psychoacoustic maskable noise energy for each specific frequency band such as a subband of Lee and to then weight each subband individually using the psychoacoustic maskable noise energy for this band that immediately results in the example of Lee, in a different power control value for each subband of the N subbands. Again, this is not disclosed in Lee.

Lee does not teach exactly how the power control value on line 419 is determined. However, since one and the same power control value is applied to all subbands, this immediately means that the power control value may be less optimal, i.e., too high for a high band where the psychoacoustic maskable noise energy is low due to the fact that the signal energy is low. This results in artifacts

introduced into this subband in accordance with Lee. However, the power control value is too low for a subband in the low frequency range, i.e., where the energy of the audio signal is high and consequently the psychoacoustic maskable noise energy is also high. In such a band, the power control value is not optimal either, since the full capability of the signal to receive the auxiliary data is not utilized to a maximum extent. Instead, the energy of the auxiliary data signal in this low frequency band is too low compared to the present invention, where the energy to the auxiliary data signal is weighted such that as much auxiliary data energy as possible is introduced into the low band of the audio signal. Therefore, the frequency-selective establishment of the psychoacoustic maskable noise energy, the subsequent weighting using the established noise energy, and the subsequent summing of the weighted information signal with the spectral values of the short-term spectrum ensures two main issues due to the fact that we have an optimum weighting parameter for each band.

For high bands, the weighting factor is as low as necessary so that any artifacts due to the auxiliary data are not perceivable in the high bands of the audio signal after the summing step.

The second feature is that in the low band, the weighting parameter is as high as possible so that the psychoacoustic masking capability of the audio signal is fully utilized. This feature ensures that the auxiliary data signal can be recovered with an acceptable quality compared to Lee, where the auxiliary data recovery is poor

or subsequently the data rate of the auxiliary data signal can be enhanced in accordance with the present invention as compared to Lee.

Furthermore, Applicants draw the Examiner's attention to the **synergy** between weighting a signal using the psychoacoustic maskable noise energy where this signal is the result of a time domain/frequency domain conversion (see the generating step) of a signal that includes the spread sequence and the information signal. Only in this scenario, the spectral envelope of the auxiliary data signal after having been spread by the spreading sequence can be envelope-shaped in accordance with the psychoacoustic masking threshold so that the weighted information signal has a spectral shape similar to the psychoacoustic maskable noise energy as a function of frequency. Instead, one has to perform another calculation that results in the power control value having **one and the same value** for all bands. However, how exactly this power control value is determined in Lee is not disclosed. Nevertheless, Lee has the clear indication for those skilled in the art that a psychoacoustic maskable noise energy as a function of frequency is not used for calculating the value for the power control on line 490 of Lee.

Because Claim 13 is substantially similar to Claim 1, it is patentable for at least the same reasons. Because Claims 2-10 and 15-16 depend upon Claim 1, they are patentable for at least the same reasons. Additional limitations recited in the independent claims or the dependent claims are not further discussed because

the limitations discussed above are sufficient to distinguish the claimed invention from the cited art.

CONCLUSION

Applicants respectfully posit that the pending claims have been distinguished from the art of record, and that all rejections of the claims have been overcome. Accordingly, Applicants respectfully request allowance of all claims. The Examiner is invited to please contact Applicants' attorney at 650-474-8400 should any questions arise.

Respectfully submitted,

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